☑007

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 Claim 1 (currently amended): A ~~communications~~ method of
2 operating an end node ~~for use~~ in a communications system
3 including at least one network node and ~~one~~ said end node,
4 the method comprising:
5   generating, from Mobile IP signals directed to said
6 end node or transmitted by said end node, a list of network
7 nodes identifying network nodes used in routing signals to
8 or from said end node, said Mobile IP signals including at
9 least one of a Mobile IP agent solicitation message, a
10 Mobile IP agent advertisement message, a Mobile IP
11 registration message and a Mobile IP registration reply
12 message;
13   ~~operating an end node to receive~~ receiving a fault
14 signal indicating a network node fault;
15   determining, using said generated list, if the network
16 node fault corresponds to a network node that is ~~important~~
17 ~~to~~ used in routing ~~of~~ signals to or from said end node; and
18   if it is determined that the network node fault
19 corresponds to a network node that is important to routing
20 of signals to or from said end node, operating the end node
21 to initiate ~~an~~ a fault response operation ~~to ameliorate the~~
22 ~~effect of the network node fault on said end node.~~

1 Claim 2 (currently amended): The method of claim 1,
2 wherein said ~~step of~~ determining step ~~if the network node~~
3 ~~fault corresponds to a network node that is important to~~
4 ~~routing of signals to or from said end node~~ includes:
5   comparing network node information included in the
6 received fault signal to ~~stored~~ information in said

2

7   <u>generated list</u> identifying at least one network node

8   ~~important to~~ <u>used in</u> routing ~~of~~ signals to or from said end

9   node.

1   Claim 3 (currently amended): The method of claim 2,

2   further comprising:

3   determining said <u>fault response</u> operation ~~to~~

4   ~~ameliorate the effect of the network node fault~~ as a

5   function of information stored in said end node, said

6   stored information relating to a plurality of possible

7   operations.

1   Claim 4 (currently amended): ~~The method of claim 3,~~

2   <u>A communications method for use in a communications system</u>

3   <u>including at least one network node and one end node, the</u>

4   <u>method comprising:</u>

5   <u>operating an end node to receive a fault signal</u>

6   <u>indicating a network node fault;</u>

7   <u>determining if the network node fault corresponds to a</u>

8   <u>network node that is used in routing signals to or from</u>

9   <u>said end node; and</u>

10   <u>if it is determined that the network node fault</u>

11   <u>corresponds to a network node that is important to routing</u>

12   <u>of signals to or from said end node, operating the end node</u>

13   <u>to initiate a fault response operation;</u>

14   <u>wherein said step of determining if the network node</u>

15   <u>fault corresponds to a network node that is important to</u>

16   <u>routing of signals to or from said end node includes:</u>

17   <u>comparing network node information included in the</u>

18   <u>received fault signal to stored information identifying at</u>

19   <u>least one network node used in routing signals to or from</u>

20   <u>said end node,</u>

21   <u>determining said fault response operation as a</u>

22   <u>function of fault response information stored in said end</u>

3

23 node, said stored fault response information relating to a
24 plurality of possible operations; and
25   wherein said step of determining said fault response
26 operation ~~to ameliorate the effect of the network node~~
27 ~~fault~~ is also performed as a function of the network node
28 at which the fault occurred with said operation being
29 selected from a plurality of possible operations based on
30 both the type of fault and which one of a plurality of
31 network nodes was the node at which the fault occurred.

1 Claim 5 (currently amended): The method of claim 2,
2 wherein said stored information identifying at least one
3 network node ~~important to~~ used in routing ~~of~~ signals to or
4 from said end node includes:
5   a list of network nodes important to the routing of
6 signals to said end node.

1 Claim 6 (currently amended): ~~The method of claim 5,~~
2 A communications method for use in a communications system
3 including at least one network node and one end node, the
4 method comprising:
5   operating an end node to receive a fault signal
6 indicating a network node fault;
7   determining if the network node fault corresponds to a
8 network node that is used in routing signals to or from
9 said end node; and
10   if it is determined that the network node fault
11 corresponds to a network node that is important to routing
12 of signals to or from said end node, operating the end node
13 to initiate a fault response operation;
14   wherein said step of determining if the network node
15 fault corresponds to a network node that is important to
16 routing of signals to or from said end node includes:

4

17   comparing network node information included in the
18   received fault signal to stored information identifying at
19   least one network node used in routing signals to or from
20   said end node, said stored information including a list of
21   network nodes important to the routing of signals to said
22   end node; and
23   wherein said stored information includes information
24   identifying a network node, in said list of network nodes,
25   which is used by said end node as at least one of a Mobile
26   IP home agent, a Session Initiation Protocol proxy server,
27   and a Session Initiation Protocol location registrar.

1   Claim 7 (original): The method of claim 5, wherein said
2   stored information includes information identifying a
3   network node which is used by said end node as an access
4   node through which said end node is coupled to other nodes
5   in the communications network.

1   Claim 8 (original): The method of claim 7, wherein the
2   access node is a base station and wherein said end node is
3   a mobile device that is coupled to said base station by a
4   wireless communications link.

1   Claim 9 (currently amended): The method of claim 4 2,
2   further comprising the step of:
3   dynamically generating at least a portion of said
4   stored information identifying network nodes important to
5   routing of signals to or from said end node from
6   information included in signals sent to or from said end
7   node.

1   Claim 10 (original): The method of claim 9, wherein said
2   step of dynamically generating at least a portion of said
3   stored information identifying network nodes includes:

5

4   operating the end node to monitor for non-fault

5 related signals and to generate at least some of said

6 stored information from the monitored non-fault related

7 signals.

1 Claim 11 (original): The method of claim 10, wherein said

2 non-fault related signals include session signaling

3 messages communicated to or from said end node.

1 Claim 12 (original): The method of claim 10, wherein said

2 non-fault related signals are routing messages.

1 Claim 13 (currently amended): ~~The method of claim 1,~~

2 ~~wherein~~

3 A communications method for use in a communications system

4 including at least one network node and one end node, the

5 method comprising:

6   operating an end node to receive a fault signal

7 indicating a network node fault;

8   determining if the network node fault corresponds to a

9 network node that is used in routing signals to or from

10 said end node; and

11   if it is determined that the network node fault

12 corresponds to a network node that is important to routing

13 of signals to or from said end node, operating the end node

14 to initiate a fault response operation, said fault response

15 operation ~~to ameliorate the effect of the network fault on~~

16 ~~said end node is~~ being a Mobile IP registration operation.

1 Claim 14 (currently amended): ~~The method of claim 1,~~

2 ~~wherein~~ A communications method for use in a communications

3 system including at least one network node and one end

4 node, the method comprising:

6

5   <u>operating an end node to receive a fault signal</u>
6 <u>indicating a network node fault;</u>
7   <u>determining if the network node fault corresponds to a</u>
8 <u>network node that is used in routing signals to or from</u>
9 <u>said end node; and</u>
10   <u>if it is determined that the network node fault</u>
11 <u>corresponds to a network node that is important to routing</u>
12 <u>of signals to or from said end node, operating the end node</u>
13 <u>to initiate a fault response operation,</u> said <u>fault response</u>
14 operation ~~to ameliorate the effect of the network fault on~~
15 ~~said end node is~~ <u>being</u> an end node state update operation.

1 Claim 15 (currently amended): The method of claim <u>6</u> ~~1~~,
2 further comprising the steps of:
3   sending a status request signal from a first network
4 node to a second network node;
5   receiving a response to said status request signal;
6 and
7   sending a network node fault signal to said end node
8 when said response indicates a fault condition.

1 Claim 16 (currently amended): The method of claim <u>6</u> ~~1~~,
2 further comprising the steps of:
3   periodically sending a status request signal from a
4 first network node to a second network node; and
5   sending a network node fault signal to said end node
6 when a response to at least one of said periodically
7 received status request signals is not received.

1 Claim 17 (original): The method of claim 16, further
2 comprising the steps of:
3   maintaining a count of the number of consecutive
4 status request signals sent to said second node for which a
5 response is not received; and

7

6   wherein said sending a network node fault signal is

7 performed in response to determining that said maintained

8 count at least equals a threshold number.

1 Claim 18 (original): The method of claim 1, further

2 comprising the steps of:

3   receiving a fault signal at a first network node; and

4   sending a network node fault signal to said end node

5 in response to receiving a fault signal.

1 Claim 19 (original): The method of claim 18, wherein said

2 step of sending a network node fault signal includes

3 periodically sending fault signals to a plurality of end

4 nodes at preselected time intervals.

1 Claim 20 (original): The method of claim 19, further

2 comprising:

3   operating at least some of said plurality of end nodes

4 to monitor for fault signals at said preselected time

5 intervals but not between said preselected time intervals.

1 Claim 21 (original): The method of claim 20, wherein said

2 fault signals are messages, each message including at least

3 one IP packet.

1 Claim 22 (currently amended): The method of claim 6 1,

2 wherein said fault signal is a multicast signal, the method

3 further comprising:

4   operating a plurality of additional end nodes to

5 receive said fault signal; and

6   operating each of the additional end nodes, in said

7 plurality of additional end nodes, to determine if the

8 network node fault corresponds to a network node that is

8

9   ~~important to~~ <u>used in</u> routing of messages to or from said

10   additional end node.

1   Claim 23 (currently amended):   The method of claim 22,

2   further comprising:

3   operating each additional end node which determines

4   that the network node fault corresponds to a network node

5   that is <u>used in</u> ~~important to~~ routing of messages to or from

6   said additional end node, to initiate ~~an~~ <u>a fault response</u>

7   operation ~~to ameliorate the effect of the network node~~

8   ~~fault on~~ <u>at</u> said additional end node.

1   Claim 24 (original):   The method of claim 22, wherein each

2   of said plurality of additional end nodes monitors for said

3   fault signal at periodic scheduled times.

1   Claim 25 (currently amended):   A communications method for

2   use in a communications system including at least one

3   network node and one end node, the method comprising:

4   operating an end node to receive a service

5   interference notification signal indicating interference

6   with service at a network node;

7   determining if the indicated service interference

8   corresponds to a network node that is ~~critical~~ <u>used in</u>

9   <u>routing signals</u> to said end node; ~~and~~

10   if it is determined that the indicated network node

11   service interference corresponds to a network node that is

12   ~~critical~~ <u>used in routing signals</u> to said end node,

13   operating the end node to initiate ~~an~~ <u>a fault response</u>

14   operation ~~to ameliorate the effect of the indicated network~~

15   ~~node service interference on said end node~~<u>; and</u>

16   <u>   wherein said step of determining said fault response</u>

17   <u>operation includes accessing stored information identifying</u>

18   <u>a plurality of possible operations and selecting from the</u>

9

19 plurality of possible operations the operation to be
20 performed based on both the type of fault and which one of
21 a plurality of network nodes was the indicated network node
22 at which the fault occurred.

1 Claim 26 (original): The communications method of claim
2 25, wherein said service interference notification signal
3 is a fault message indicating a service outage at said
4 network node due to a network node fault.

1 Claim 27 (original): The method of claim 26, wherein said
2 step of determining if the indicated service interference
3 corresponds to a network node that is critical to said end
4 node includes:
5   comparing network node information included in the
6 received message to stored information identifying network
7 nodes critical to said end node.

1 Claim 28 (original): The method of claim 27, wherein a
2 network node is critical to said end node if said network
3 node is necessary for proper routing of at least some
4 signals to said end node.

1 Claim 29 (canceled):

1 Claim 30 (original): The method of claim 25 ~~29~~, wherein
2 said stored information includes information identifying a
3 network node which is used by said end node as at least one
4 of a Mobile IP home agent, a Session Initiation Protocol
5 proxy server and a Session Initiation Protocol location
6 registrar.

1 Claim 31 (currently amended): ~~The method of claim 25,~~ A
2 communications method for use in a communications system

10

3 including at least one network node and one end node, the

4 method comprising:

5 operating an end node to receive a service

6 interference notification signal indicating interference

7 with service at a network node;

8 determining if the indicated service interference

9 corresponds to a network node that is used in routing

10 signals to said end node;

11 if it is determined that the indicated network node

12 service interference corresponds to a network node that is

13 used in routing signals to said end node, operating the end

14 node to initiate a fault response operation; and

15 wherein said end node is a mobile node connected by a

16 wireless communications link to an access node that is

17 coupled to said indicated network node, said mobile node

18 including a stored list of critical nodes and actions to be

19 taken ~~to ameliorate the effect of~~ in response to faults at

20 said listed critical nodes.

1 Claim 32 (original): The method of claim 31, further

2 comprising:

3 generating at least a portion of said stored

4 information identifying network nodes from at least one of

5 a Mobile IP agent solicitation message, Mobile IP agent

6 advertisement message, Mobile IP registration message and a

7 Mobile IP registration reply message communicated between

8 said end node and said access node over the wireless

9 communications link.

1 Claim 33 (currently amended): The method of claim 25 ~~29~~,

2 further comprising the step of:

3 dynamically generating at least a portion of said

4 stored information identifying network nodes critical to

11

5 said end node from information included in signals sent to
6 or from said end node.

1 Claim 34 (original): ~~The method of claim 25~~, A
2 communications method for use in a communications system
3 including at least one network node and one end node, the
4 method comprising:
5   operating an end node to receive a service
6 interference notification signal indicating interference
7 with service at a network node;
8   determining if the indicated service interference
9 corresponds to a network node that is used in routing
10 signals to said end node;
11   if it is determined that the indicated network node
12 service interference corresponds to a network node that is
13 used in routing signals to said end node, operating the end
14 node to initiate a fault response operation; and
15   wherein said fault response operation ~~to ameliorate~~
16 ~~the effect of the network fault on said end node~~ is a
17 Mobile IP registration operation.

1 Claim 35 (original): The method of claim 25, further
2 comprising:
3   operating said end node to monitor for service
4 interference signals at preselected time intervals but not
5 between said preselected time intervals.

1 Claim 36 (currently amended): The method of claim 25,
2 wherein said service interference signal is a multicast
3 signal, the method further comprising:
4   operating a plurality of additional end nodes to
5 receive said service interference notification signal; and
6   operating each of the additional end nodes, in said
7 plurality of additional end nodes, to determine if the

12

8   indicated network node service interference corresponds to

9   a network node that is ~~important to~~ <u>used in</u> routing ~~of~~

10   messages to or from said additional end node.

1   Claim 37 (currently amended): The method of claim 36,

2   further comprising:

3   operating each additional end node which determines

4   that the service interference notification signal

5   corresponds to a network node that is <u>used in</u> ~~important to~~

6   routing of messages to or from said additional end node, to

7   initiate ~~an operation to ameliorate the effect of the~~

8   ~~service interference on~~ a <u>fault response operation at</u> said

9   additional end node.

1   Claim 38 (original): The communications method of claim

2   25, wherein said service interference notification signal

3   is a message indicating a scheduled service outage at said

4   network node.

1   Claim 39 (currently amended): A <u>mobile</u> communications

2   device, comprising:

3   ~~memory~~ means for storing ~~including~~ a set of ~~stored~~

4   information indicating network nodes which are <u>used in</u>

5   ~~necessary to proper~~ routing of signals either to said

6   <u>mobile</u> communications device or from said <u>mobile</u>

7   communications device to other network nodes;

8   ~~receiver circuitry~~ means for <u>for</u> receiving messages

9   from network nodes including service interference

10   notification messages indicating service interference at a

11   network node;

12   <u>means for generating, from Mobile IP signals directed</u>

13   <u>to said end node or transmitted by said end node, a list of</u>

14   <u>network nodes identifying network nodes used in routing</u>

15   <u>signals to or from said mobile communications devcie, said</u>

13

16   Mobile IP signals including at least one of a Mobile IP

17   agent solicitation message, a Mobile IP agent advertisement

18   message, a Mobile IP registration message and a Mobile IP

19   registration reply message; and

20   means for processing received service interference

21   notification messages to determine, using said generated

22   list, if service interference indicated by a received

23   network service interference notification message indicates

24   service interference at a network node necessary to proper

25   used in routing of signals either to said moible

26   communications device or from said mobile communications

27   device to another network node.

1   Claim 40 (currently amended): The mobile communications

2   device of claim 39 38,

3   .   wherein said device includes a wireless transmitter is

4   a portable device; and

5   wherein said receiver circuitry means for recieving

6   includes a radio receiver circuit.

1   Claim 41 (currently amended): The mobile communications

2   device of claim 40, further comprising:

3   means for controlling the mobile communications device

4   to monitor for said service interference notification

5   messages at preselected intervals but not between said

6   preselected time intervals.

1   Claim 42 (currently amended): The communications device of

2   claim 40,

3   A communications device, comprising:

4   memory including a set of stored information

5   indicating network nodes which are used in routing of

6   signals either to said communications device or from said

7   communications device to other network nodes;

14

8   receiver circuitry for receiving messages from network
9   nodes including service interference notification messages
10 indicating service interference at a network node; and
11   a processor module for processing received service
12 interference notification messages to determine if service
13 interference indicated by a received network service
14 interference notification message indicates service
15 interference at a network node used in routing of signals
16 either to said communications device or from said
17 communications device to another network node; and
18   wherein said set of stored information includes
19 information identifying a network node which is used by
20 said end node as at least one of a Mobile IP home agent, a
21 Session Initiation Protocol proxy server and a Session
22 Initiation Protocol location registrar.

1   Claim 43 (currently amended):   The communications device of
2   claim 42, further comprising:
3   means for generating at least a portion of said set of
4   stored information indicating network nodes which are
5   ~~necessary to proper~~ are used in routing ~~of~~ signals from at
6   least one of a Mobile IP signal and a Session Initiation
7   Protocol signal.

1   Claim 44 (currently amended):   The communications device of
2   claim 43, wherein said communications device is a mobile
3   node connected by a wireless communications link to an
4   access node that is coupled to said indicated network node,
5   said set of stored information including fault response
6   actions to be taken to ~~ameliorate the effect of~~ respond to
7   faults at network nodes ~~which are necessary to proper~~ used
8   in routing ~~of~~ IP packets to said mobile node.

15

1 Claim 45 (currently amended): The communications device of
2 claim 44, wherein one of said <u>fault response</u> actions ~~to be~~
3 ~~taken to ameliorate the effect of faults at network nodes~~
4 is a Mobile IP registration operation.

1 Claim 46 (new): A device including a processor configured
2 to control an end node in a communications system including
3 at least one network node and said end node to implement a
4 method, the method comprising:
5   generating, from Mobile IP signals directed to said
6 end node or transmitted by said end node, a list of network
7 nodes identifying network nodes used in routing signals to
8 or from said end node, said Mobile IP signals including at
9 least one of a Mobile IP agent solicitation message, a
10 Mobile IP agent advertisement message, a Mobile IP
11 registration message and a Mobile IP registration reply
12 message;
13   receiving a fault signal indicating a network node
14 fault;
15   determining, using said generated list, if the network
16 node fault corresponds to a network node that is used in
17 routing signals to or from said end node; and
18   if it is determined that the network node fault
19 corresponds to a network node that is important to routing
20 of signals to or from said end node, operating the end node
21 to initiate a fault response operation.

1 Claim 47 (new): The device of claim 46, wherein said method
2 further comprises:
3   comparing network node information included in the
4 received fault signal to information in said generated list
5 identifying at least one network node used in routing
6 signals to or from said end node.

16

1· Claim 48 (new):   A computer readable medium embodying
2 machine executable instructions for controlling an end node
3 in a communications system including at least one network
4 node and said end node to implement a method, the method
5. comprising:
6   generating, from Mobile IP signals directed to said
7 end node or transmitted by said end node, a list of network
8 nodes identifying network nodes used in routing signals to
9 or from said end node, said Mobile IP signals including at
10 least one of a Mobile IP agent solicitation message, a
11 Mobile IP agent advertisement message, a Mobile IP
12 registration message and a Mobile IP registration reply
13 message;
14   receiving a fault signal indicating a network node
15 fault;.
16   determining, using said generated list, if the network
17 node fault corresponds to a network node that is used in
18 routing signals to or from said end node; and
19   if it is determined that the network node fault
20 corresponds to a network node that is important to routing
21 of signals to or from said end node, operating the end node
22 to initiate a fault response operation.

1 Claim 49 (new):   The computer readable medium of claim 48,
2 wherein said method further comprises:
3   comparing network node information included in the
4 received fault signal to information in said generated list
5 identifying at least one network node used in routing
6 signals to or from said end node.

1 Claim 50 (new): A device including a processor configured
2 to control an end node in a communications system including
3 at least one network node and said end node to implement a
4 method, the method comprising:

17

5   receiving a fault signal indicating a network node
6   fault;
7   determining if the network node fault corresponds to a
8   network node that is used in routing signals to or from
9   said end node; and
10   if it is determined that the network node fault
11   corresponds to a network node that is important to routing
12   of signals to or from said end node, operating the end node
13   to initiate a fault response operation;
14   wherein said step of determining if the network node
15   fault corresponds to a network node that is important to
16   routing of signals to or from said end node includes:
17   comparing network node information included in the
18   received fault signal to stored information identifying at
19   least one network node used in routing signals to or from
20   said end node,
21   determining said fault response operation as a
22   function of fault response information stored in said end
23   node, said stored fault response information relating to a
24   plurality of possible operations; and
25   wherein said step of determining said fault response
26   operation is also performed as a function of the network
27   node at which the fault occurred with said operation being
28   selected from a plurality of possible operations based on
29   both the type of fault and which one of a plurality of
30   network nodes was the node at which the fault occurred.

1   Claim 51 (new): A computer readable medium embodying
2   machine executable instructions for controlling an end node
3   in a communications system including at least one network
4   node and said end node to implement a method, the method
5   comprising:
6   receiving a fault signal indicating a network node
7   fault;

18

8   determining if the network node fault corresponds to a
9   network node that is used in routing signals to or from
10 said end node; and
11   if it is determined that the network node fault
12 corresponds to a network node that is important to routing
13 of signals to or from said end node, operating the end node
14 to initiate a fault response operation;
15   wherein said step of determining if the network node
16. fault corresponds to a network node that is important to
17 routing of signals to or from said end node includes:
18   comparing network node information included in the
19 received fault signal to stored information identifying at
20 least one network node used in routing signals to or from
21 said end node,
22   determining said fault response operation as a
23 function of fault response information stored in said end
24 node, said stored fault response information relating to a
25 plurality of possible operations; and
26   wherein said step of determining said fault response
27 operation is also performed as a function of the network
28 node at which the fault occurred with said operation being
29 selected from a plurality of possible operations based on
30 both the type of fault and which one of a plurality of
31 network nodes was the node at which the fault occurred.

1   Claim 52 (new): A mobile communications device,
2   comprising:
3   memory including a set of stored information
4   indicating network nodes which are used in routing of
5   signals either to said mobile communications device or from
6   said mobile communications device to other network nodes;
7   receiver circuitry for receiving messages from network
8   nodes including service interference notification messages
9   indicating service interference at a network node;

19

10   a list generation module for generating, from Mobile

11   IP signals directed to said end node or transmitted by said

12   end node, a list of network nodes identifying network nodes

13   used in routing signals to or from said mobile

14   communications device, said Mobile IP signals including at

15   least one of a Mobile IP agent solicitation message, a

16   Mobile IP agent advertisement message, a Mobile IP

17   registration message and a Mobile IP registration reply

18   message; and

19   a processor for processing received service

20   interference notification messages to determine, using said

21   generated list, if service interference indicated by a

22   received network service interference notification message

23   indicates service interference at a network node used in

24   routing of signals either to said mobile communications

25   device or from said mobile communications device to another

26   network node.

1   Claim 53 (new): The mobile communications device of claim

2   52,

3   wherein said device includes a wireless transmitter;

4   and

5   wherein said receiver circuitry includes a radio

6   receiver circuit.

20